



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
[www.uspto.gov](http://www.uspto.gov)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/814,258	04/01/2004	Takashi Ito	251288US2	6972
22850	7590	04/17/2006		EXAMINER
OBLON, SPIVAK, MCCLELLAND, MAIER & NEUSTADT, P.C. 1940 DUKE STREET ALEXANDRIA, VA 22314			ZERVIGON, RUDY	
			ART UNIT	PAPER NUMBER
			1763	

DATE MAILED: 04/17/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	10/814,258	ITO, TAKASHI	
	<b>Examiner</b>	<b>Art Unit</b>	
	Rudy Zervigon	1763	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) Responsive to communication(s) filed on 23 January 2006.
- 2a) This action is FINAL.                    2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) Claim(s) 1-21 is/are pending in the application.
- 4a) Of the above claim(s) 11-18 and 20 is/are withdrawn from consideration.
- 5) Claim(s) \_\_\_\_\_ is/are allowed.
- 6) Claim(s) 1-10,19 and 21 is/are rejected.
- 7) Claim(s) \_\_\_\_\_ is/are objected to.
- 8) Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on \_\_\_\_\_ is/are: a) accepted or b) objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) All    b) Some \* c) None of:
  1. Certified copies of the priority documents have been received.
  2. Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                    | Paper No(s)/Mail Date. _____.   |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____. | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
|   | 6) <input type="checkbox"/> Other: _____.                                   |

**DETAILED ACTION*****Election/Restrictions***

1. Applicant's election with traverse of claims 1-10, 19 (claim 21 is added by amendment) in the reply filed on January 23, 2006 is acknowledged. The traversal is on the ground that Applicant's January 23<sup>rd</sup> amendment is sufficient to demonstrate one single inventive concept. This is not found persuasive because Applicant's January 23<sup>rd</sup> amendment is insufficient to demonstrate one single inventive concept as was already demonstrated in the December 22<sup>nd</sup> requirement which demonstrates that alternate gas identities (not limiting in apparatus claims, see below) are capable of performing varied processing methods.

The requirement is still deemed proper and is therefore made FINAL.

***Claim Rejections - 35 USC § 102***

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1-7, 10, and 19 are rejected under 35 U.S.C. 102(b) as being anticipated by Fairbairn; Kevin et al. (US 5838121 A). Fairbairn teaches a processing apparatus (Figure 4, 19, and 24; - see common “106”; column 4, lines 35-55), comprising: a transfer chamber (104; Figure 4; column 4, lines 35-55); a plurality of processing chambers (106; Figure 4, 19, and 24; - see common “106”; column 4, lines 35-55) for processing therein a substrate (“wafer”; throughout) to be processed, the processing chambers (106; Figure 4, 19, and 24; - see common

“106”; column 4, lines 35-55) being coupled to the transfer chamber (104; Figure 4; column 4, lines 35-55); a number of electrostatic chucks (“pedestal 628”; Figure 19; column 14, lines 50-55; column 12; line 15) which are provided in the processing chambers (106; Figure 4, 19, and 24; - see common “106”; column 4, lines 35-55), to electrostatically adsorb the substrate (“wafer”; throughout) to be processed thereto; a transfer mechanism (500; Figure 15; column 8, line 53 - column 9, line 4) installed in the transfer chamber (104; Figure 4; column 4, lines 35-55) to transfer the substrate (“wafer”; throughout) to be processed between the processing chambers (106; Figure 4, 19, and 24; - see common “106”; column 4, lines 35-55) and the transfer chamber (104; Figure 4; column 4, lines 35-55); and a monatomic nitrogen (column 20, lines 12-13) atom supply unit (800; Figure 23,24; column 18, lines 18-40) for supplying dissociated monatomic nitrogen (column 20, lines 12-13) atoms into the processing chambers (106; Figure 4, 19, and 24; - see common “106”; column 4, lines 35-55), as claimed by claim 1.

Fairbairn further teaches:

- i. A processing apparatus (Figure 4, 19, and 24; - see common “106”; column 4, lines 35-55), comprising: a transfer chamber (104; Figure 4; column 4, lines 35-55); a first processing chamber (first 106; Figure 4, 19, and 24; - see common “106”; column 4, lines 35-55) coupled to the transfer chamber (104; Figure 4; column 4, lines 35-55), the first processing chamber (first 106; Figure 4, 19, and 24; - see common “106”; column 4, lines 35-55) performing therein a first process on a substrate (“wafer”; throughout) to be processed; a second processing chamber (second 106; Figure 4, 19, and 24; - see common “106”; column 4, lines 35-55) coupled to the transfer chamber (104; Figure 4; column 4, lines 35-55), the second processing chamber (second 106; Figure 4, 19, and 24; - see

common “106”; column 4, lines 35-55) performing therein a second process on the substrate (“wafer”; throughout) to be processed; a transfer mechanism (500; Figure 15; column 8, line 53 - column 9, line 4) installed in the transfer chamber (104; Figure 4; column 4, lines 35-55) for sequentially transferring the substrate (“wafer”; throughout) to be processed into the first and second processing chamber; electrostatic chucks (“pedestal 628”; Figure 19; column 14, lines 50-55; column 12; line 15) provided in the first and the second processing chambers (106; Figure 4, 19, and 24; - see common “106”; column 4, lines 35-55), the electrostatic chucks (“pedestal 628”; Figure 19; column 14, lines 50-55; column 12; line 15) electrostatically adsorbing thereto the substrate (“wafer”; throughout) to be processed; and a monatomic nitrogen (column 20, lines 12-13) atom supply unit (800; Figure 23,24; column 18, lines 18-40) for supplying dissociated monatomic nitrogen (column 20, lines 12-13) atoms into the first and second processing chamber (second 106; Figure 4, 19, and 24; - see common “106”; column 4, lines 35-55), as claimed by claim 2

- ii. The processing apparatus (Figure 4, 19, and 24; - see common “106”; column 4, lines 35-55) of claim 1, wherein the monatomic nitrogen (column 20, lines 12-13) atom supply unit (800; Figure 23,24; column 18, lines 18-40) supplies the dissociated monatomic nitrogen (column 20, lines 12-13) atoms to a close proximity of the electrostatic chucks (“pedestal 628”; Figure 19; column 14, lines 50-55; column 12; line 15), as claimed by claim 3
- iii. The processing apparatus (Figure 4, 19, and 24; - see common “106”; column 4, lines 35-55) of claim 2, wherein the monatomic nitrogen (column 20, lines 12-13) atom supply

unit (800; Figure 23,24; column 18, lines 18-40) supplies the dissociated monatomic nitrogen (column 20, lines 12-13) atoms to a close proximity of the electrostatic chucks (“pedestal 628”; Figure 19; column 14, lines 50-55; column 12; line 15), as claimed by claim 4

- iv. The processing apparatus (Figure 4, 19, and 24; - see common “106”; column 4, lines 35-55) of claim 2, wherein the monatomic nitrogen (column 20, lines 12-13) atom supply unit (800; Figure 23,24; column 18, lines 18-40) supplies the dissociated monatomic nitrogen (column 20, lines 12-13) atoms into the transfer chamber (104; Figure 4; column 4, lines 35-55), as claimed by claim 5. Applicant’s claim requirement is an intended use claim requirement. Further, it has been held that claim language that simply specifies an intended use or field of use for the invention generally will not limit the scope of a claim (Walter , 618 F.2d at 769, 205 USPQ at 409; MPEP 2106). Additionally, in apparatus claims, intended use must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim (In re Casey,152 USPQ 235 (CCPA 1967); In re Otto , 136 USPQ 458, 459 (CCPA 1963); MPEP2111.02). When the structure recited in the reference is substantially identical to that of the claims, claimed properties or functions are presumed to be inherent (In re Best, 562 F.2d 1252, 1255, 195 USPQ 430, 433 (CCPA 1977); MPEP 2112.01).
- v. The processing apparatus (Figure 4, 19, and 24; - see common “106”; column 4, lines 35-55) of claim 2, further comprising a controller (810; Figure 24; column 18, lines 20-25)

for controlling a supply timing of the dissociated monatomic nitrogen (column 20, lines 12-13) atoms from the monatomic nitrogen (column 20, lines 12-13) atom supply unit (800; Figure 23,24; column 18, lines 18-40), as claimed by claim 6

- vi. The processing apparatus (Figure 4, 19, and 24; - see common “106”; column 4, lines 35-55) of claim 2, wherein the monatomic nitrogen (column 20, lines 12-13) atom supply unit (800; Figure 23,24; column 18, lines 18-40) includes a pipe (812; Figure 24; column 18, lines 20-25) communicating with the processing chambers (106; Figure 4, 19, and 24; - see common “106”; column 4, lines 35-55), an N<sub>2</sub> gas supply source (804/814; Figure 24; column 18, lines 20-25) for supplying an N<sub>2</sub> gas through the pipe (812; Figure 24; column 18, lines 20-25), and an energy supply unit (808; Figure 23,24; column 18, lines 18-40) for applying energy to the N<sub>2</sub> gas in the pipe (812; Figure 24; column 18, lines 20-25) or in the processing chambers (106; Figure 4, 19, and 24; - see common “106”; column 4, lines 35-55) to convert the N<sub>2</sub> gas into the dissociated monatomic nitrogen (column 20, lines 12-13) atoms, as claimed by claim 7
- vii. The processing apparatus (Figure 4, 19, and 24; - see common “106”; column 4, lines 35-55) of claims 6, wherein the energy supply unit (808; Figure 23,24; column 18, lines 18-40) applies energy which is higher than the dissociation energy of the N<sub>2</sub> gas and lower than the ionization energy of the N<sub>2</sub> gas, to the N<sub>2</sub> gas, as claimed by claim 10
- viii. A processing apparatus (Figure 4, 19, and 24; - see common “106”; column 4, lines 35-55), comprising: a processing chamber for processing therein a substrate (“wafer”; throughout) to be processed; an electrostatic chuck (“pedestal 628”; Figure 19; column 14, lines 50-55; column 12; line 15) installed in the processing chamber (106; Figure 4,

19, and 24; - see common "106"; column 4, lines 35-55), for adsorbing the substrate ("wafer"; throughout) to be process thereto; and a monatomic N atom supply unit (800; Figure 23,24; column 18, lines 18-40) for supplying dissociated monoatomic N atoms into the processing chamber (106; Figure 4, 19, and 24; - see common "106"; column 4, lines 35-55), as claimed by claim 19

***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 8, 9, and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fairbairn; Kevin et al. (US 5838121 A) in view of Lee; Chung J. et al. (US 6086679 A). Fairbairn is discussed above.

Fairbairn further teaches a processing apparatus (Figure 4, 19, and 24; - see common "106"; column 4, lines 35-55), which includes a processing chamber (106; Figure 4, 19, and 24; - see common "106"; column 4, lines 35-55) for processing a substrate ("wafer"; throughout) to be processed and an electrostatic chuck ("pedestal 628"; Figure 19; column 14, lines 50-55; column 12; line 15), installed in the processing chamber (106; Figure 4, 19, and 24; - see common "106"; column 4, lines 35-55), for adsorbing the substrate ("wafer"; throughout) to be processed thereto, comprising: - claim 21

- a. means for transferring the substrate ("wafer"; throughout) to be processed into the processing chamber – claim 21. Support for this portion of claim 21 is found in

section [0031]. Specifically, the specification teaches “wafer transfer mechanism 6”. Fairbairn teaches a wafer transfer mechanism 500. As such, Fairbairn teaches an equivalent apparatus that performs the function of transferring wafers. As a result, Fairbairn’s prior art elements of 500; Figure 15; column 8, line 53 - column 9, line 4 for transferring wafers performs the identical function of transferring wafers in substantially the same way, and produces substantially the same results as the corresponding elements disclosed in the specification (MPEP 2183).

- b. means for adsorbing the substrate (“wafer”; throughout) to be processed to the electrostatic chuck – claim 21. Support for this portion of claim 21 is found in section [0010]. Specifically, the specification teaches “the electrostatic chucks electrostatically adsorbing thereto the substrate to be processed”. Fairbairn teaches an electrostatic chuck (“pedestal 628”; Figure 19; column 14, lines 50-55; column 12; line 15). As such, Fairbairn teaches an equivalent apparatus that performs the function of “adsorbing the substrate”. As a result, Fairbairn’s prior art elements of 628 for “adsorbing the substrate” perform the identical function of “adsorbing the substrate” in substantially the same way, and produces substantially the same results as the corresponding elements disclosed in the specification (MPEP 2183).

Fairbairn does not teach:

- i. The processing apparatus (Figure 4, 19, and 24; - see common “106”; column 4, lines 35-55) of claim 6, wherein the energy supply unit (808; Figure 23,24; column 18, lines 18-

40) has an ultraviolet irradiation unit for irradiating ultraviolet ray to the N<sub>2</sub> gas, as claimed by claim 8

- ii. The processing apparatus (Figure 4, 19, and 24; - see common “106”; column 4, lines 35-55) of claim 6, wherein the pipe (812; Figure 24; column 18, lines 20-25) has a dielectric portion, and the energy supply unit (808; Figure 23,24; column 18, lines 18-40) has an induction coil wound around the dielectric portion and a high frequency power supply for applying a high frequency to the induction coil, as claimed by claim 9
- iii. means for supplying dissociated monatomic N atoms into the processing chamber, wherein the monatomic N atoms are supplied into the processing chamber (106; Figure 4, 19, and 24; - see common “106”; column 4, lines 35-55) for processing the substrate (“wafer”; throughout) therein – claim 21

Lee teaches energy supply units as UV (426, Figure 4) and induction coil supply units (626, 628; Figure 6) wound a dielectric pipe (620; Figure 6). Means for supplying dissociated monatomic N atoms into the processing chamber, wherein the monatomic N atoms are supplied into the processing chamber (106; Figure 4, 19, and 24; - see common “106”; column 4, lines 35-55) for processing the substrate (“wafer”; throughout) therein – claim 21. Support for this portion of claim 21 is found in section [0061]. Specifically, the specification teaches “In addition, an induction coil 96 is wound around the gas pipe 93, and the high frequency power is applied from a high frequency power supply 97 to the induction coil 96.”. Lee teaches an induction coil 628 is wound around the gas pipe 620, and the high frequency power is applied from a high frequency power supply 626 to the induction coil 628. As such, Lee teaches an equivalent apparatus that performs the function of means for supplying dissociated gas (gas identity is intended use). As a

Art Unit: 1763

result, Fairbairn's prior art elements of 628, 620, and 626 for supplying dissociated gas (gas identity is intended use) perform the identical function of supplying dissociated gas (gas identity is intended use) in substantially the same way, and produces substantially the same results as the corresponding elements disclosed in the specification (MPEP 2183).

It would have been obvious to one of ordinary skill in the art at the time the invention was made for Fairbairn to use alternate and equivalent means for plasma generation as taught by Lee.

Motivation for Fairbairn to use alternate and equivalent means for plasma generation as taught by Lee (column 22, line 58 – column 25, line 50).

***Conclusion***

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Rudy Zervigon whose telephone number is (571) 272-1442. The examiner can normally be reached on a Monday through Thursday schedule from 8am through 7pm. The official fax phone number for the 1763 art unit is (571) 273-8300. Any Inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Chemical and Materials Engineering art unit receptionist at (571) 272-1700. If the examiner can not be reached please contact the examiner's supervisor, Parviz Hassanzadeh, at (571) 272-1435.

  
6/14/16